PROJECT TITLE : Instrumentation and process automation

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Data processing of finished products QC

The following specifications were presented to four different computer product companies (Hewlett-Packard, Digital Equipment, IBM, Data General) in order to evaluate the best configuration for data acquisition and processing in the smoking laboratory.

- Acquisition of data directly from instruments under computer control (on-line mode).
- Automatic print out of reports and results listing.
- Flexibility for extension to other instruments in the future.
- High reliability in data transfer and storage.
- Off-ranges analytical values detection.
- Computer control extendable in a radius of 500 m around instrumentation.
- Simple handshaking between computer and technicians.
- System exploitation under non-specialist personnel.
- Wide ranges of interfaces available to allow powerful communications with different kind of instruments.
- Local data storage capacity for one month.
- Software flexibility for acquisition task control.
- Communication with host computer for periodical transfer of analytical results.
- Sample encoding.
- Acknowledge of recorded data on each workplace.

The most attractive and complete system was proposed by Hewlett-Packard and is briefly described below.

Hewlett-Packard proposal

The proposed configuration is built around the HP 1000 F computer with 20 M bytes disk storage capacity.
A single cable named "data link" connects the different instruments to the computer. On the link, and on each workplace, a simple terminal with build-in interfaces controls all transactions between computer and the instruments.

The sequential commands and instructions are given in an interactive mode by a restricted set of predefined function keys.
Each terminal recognizes the sample to be processed after reading a bar code written label, generated by a printer, under computer control. An alphanumeric code of up to 20 characters could be used as sample identifier.
The code is the specific access key for future interrogation of results data bank.

Hewlett-Packard proposed also a powerful software named DATACAP and IMAGE 1000 for the management of all transactions between the instruments and the computer.

Through an interactive interrogation mode, each workplace terminal could be configured, defining only a set of parameters which are introduced under DATACAP control. For special purposes, subroutines written in FORTRAN allow a better control of the complicated instruments.

In the future, new products announced within the next 8 months and kindly described by the HP engeeners of Grenoble, will provide us a great flexibility for interfacing the smoking machines and instruments with BCD (Binary Coded Decimal) outputs such as weighing machines.
Another interesting feature of this proposal is the compatibility with all instruments from the HP family (GC, HPLC) through the universal communication bus, named "HP-IB" (Hewlett-Packard Instrumentation Bus) which is fully supported in that application. This bus is normalized since 1975 under the code IEE 488 and several another instrument manufacturers are now producing HP-IB compatible machines for analytical chemistry.

In the context of a smoking laboratory, the HP configuration will provide us the following system benefits:

- Reduce error risk in data transfer.
- Increase operator disponibility.
- Speed up access to analytical results.
- Save time and operators.
- Prepare the laboratory for a more complete automatization.
- Follow up of the samples in the laboratory (analysis in progress).
- Collect temporary QC data for different users.
- Give immediate information on off-range analytical results.

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